

Talwinder Singh



Field of research:

Space Weather

Name of institute:

Indian Institute of Technology (Banaras Hindu University) Varanasi

Pursuing degree:

5 Year Integrated MTech in Engineering Physics

Completed degree (in descending order):

NA

Trainings Taken (in descending order):

The University of Sheffield, UK and Debrecen Heliophysical observatory, Hungary (July-August 2015): Visited The University of Sheffield, UK and Debrecen Heliophysical Observatory as a summer intern under the supervision of Prof. Robertus Erdelyi. Investigated the relationship between physical characteristics of Coronal mass ejections (CMEs) with their source active regions. This should help in predicting the occurrence of a CME along with its physical characteristics. Work is still going on in this project and has potential of giving good scientific results.

Udaipur Solar Observatory, India (December 2014, December 2013): Visited Udaipur Solar observatory as a winter intern under the supervision of Dr. Nandita Srivastava. Investigated the collision of CMEs in interplanetary space and their subsequent effect on space weather around Earth. This work included the use of multiple views of Coronal mass ejections in interplanetary space from STEREO mission.

Technical University of Catalunya, Barcelona, Spain (June-July 2014): Visited IonSAT group in Technical University of Catalunya under the supervision of Prof. Manuel Hernandez Pajares. Defined a factor called GNSS Solar Flare Activity Indicator (GSFLAI) that is calculated from global GPS data. Showed the use of GSFLAI in detection of Solar flares and measurement of solar EUV flux rate during solar flares.

Indian Institute of Science Education and Research, Mohali, India (June-July 2013): Visited IISER Mohali as a summer intern under the supervision of Dr. Kavita Dorai. Wrote programs in R language to carry out multivariate analysis of Metabolomic Nuclear Magnetic resonance (NMR) data. These programs were then used to find antioxidant content in different varieties of Tea.

Publications (in descending order):

1) **T. Singh**, M. Hernandez-Pajares, E. Monte, A. Garcia-Rigo, G. Olivares-Pulido 2015. GPS as a Solar observational instrument: Real-time estimation of EUV photons flux rate during strong, medium and weak Solar flares. Journal of Geophysical Research-Space Physics, Impact Factor: 3.44, [DOI: 10.1002/2015JA021824](https://doi.org/10.1002/2015JA021824)

2) W. Mishra, N. Srivastava, **T. Singh** 2015. Kinematics of Interacting CMEs of September 25 and 28, 2012. Journal of Geophysical Research-Space Physics, Impact Factor: 3.44, [DOI: 10.1002/2015JA021415](https://doi.org/10.1002/2015JA021415)

Oral presentation (in descending order):

1) At Udaipur Solar Observatory on "Use of GPS data as a proxy to find Solar EUV Flux rate"

2) At Debrecen Heliophysical Observatory on "Use of STEREO data for Space weather and Magneto seismology in Solar Corona"

Poster presentations (in descending order):

Poster in Dynamic Sun: 1 conference at Varanasi, India with Topic "On Estimating the Radial Profile of Magnetic Field in Coronal Streamers"

Schools/Workshops Attended (in descending order):

School on Science for Space Weather in Goa, India

Purpose of study in the research field (in 1000 words):

The smooth functioning of the economy and the welfare of society depends upon an ever-growing set of services and facilities that are reliant on space- and ground-based infrastructure. Examples include communications (radio, TV, mobile-phones), navigation of aircraft and private transport via GPS, and service industries (e.g. banking). These services, however, can be adversely affected by the Space Weather (SW) hazards. The forecasting of SW hazards, driven by dynamical processes like flares and Coronal Mass Ejections (CMEs) originating in the Sun, is critical to the mitigation of their destructive effects. By pursuing research work in this area, I wish to make a leap toward developing an more accurate and reliable forecast tool for Space Weather. I want to combine new physical insight with data analysis and modelling, to significantly improve the current modelling capabilities and to contribute towards achieving a specific and focused forecast tool to predict with high confidence the occurrence and severity of Space Weather events.

Other details:

Awards & Honour (i.e.NET/SLAT/JEST/GATE/Any equivalent):

IIT JEE All India rank: 4447 (99.1 Percentile)

GATE All India Rank: 50 (98.5 Percentile)

Any other examinations (i.e. IELTS/TOFEL/ any equivalent)

GRE: 324(Q:170, V:154, W:4.5)

TOEFL: 107

Computer Operating and/or Programming Skill:

C/C++

IDL

MATLAB

AWK

Language Skill

Punjabi, English, Hindi

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Talwinder is a senior undergraduate student at Indian Institute of Technology (BHU) Varanasi pursuing Integrated MTech in Engineering Physics. He has been working in the field of Space weather from last two and a half year through various internships. He has visited Udaipur Solar Observatory India, Debrecen Heliophysical Observatory Hungary,

The University of Sheffield UK and Technical University of Catalunya Barcelona Spain to do research work in on various subjects of Space weather.